

# APL2200 SERIES



APL2200 series amplifiers are designed to produce up to 60 mJ picosecond pulses at kilohertz pulse repetition rate.

Short pulse duration, excellent pulse-to-pulse stability, superior beam quality makes APL2200 series diode pumped picosecond amplifiers well suited for applications like OPCPA pumping, material processing, non-linear optics and others.

## Master oscillator / power amplifier (MOPA) design

APL2200 series amplifiers are designed to be seeded by PL2210 series lasers.

Pulses from PL2210x lasers are spatially shaped and amplified in double-pass amplifiers with thermally induced birefringence compensation. Advanced optical design ensures smooth, without hot spots beam

spatial profile at the laser output. Low light depolarization level allows high efficiency generation of up to 4th harmonics with build-in harmonics generators.

The amplifiers are compatible with all optional items that are offered for seed lasers of PL2210 series. For example, repetition rate and timing of the pulses can be locked to the external RF source (with -PLL option) or other ultrafast laser system (with -FS option).

## Build-in harmonic generators

Angle-tuned LBO and/or BBO crystals mounted in temperature stabilized heaters are used for second, third and fourth harmonic generation. Harmonics separation system is designed to ensure high spectral purity of radiation and direct it to the output ports.

## APL2200 series available models

Model	Features
APL2201	Delivers 10 mJ, 90 ps pulses at up to 1 kHz repetition rate
APL2203	Delivers 30 mJ, 90 ps pulses at up to 1 kHz repetition rate
APL2205	Delivers 60 mJ, 90 ps pulses at up to 1 kHz repetition rate

## High Repetition Rate, High Pulse Energy Amplifiers

### FEATURES

- ▶ High pulse energy at **kHz** rates
- ▶ Diode pumped **solid state design**
- ▶ Cooled by supplied chiller – tap water is not required
- ▶ **Low maintenance costs**
- ▶ Remote control pad
- ▶ PC control via USB with supplied LabVIEW™ drivers
- ▶ Optional temperature stabilized second, third and fourth harmonic generators

### APPLICATIONS

- ▶ Time resolved fluorescence, pump-probe spectroscopy
- ▶ OPG/OPA pumping
- ▶ OPCPA pumping
- ▶ Micromachining
- ▶ Other spectroscopic and nonlinear optics applications...

## Simple and convenient laser control

For customer convenience the amplifier can be controlled through user-friendly remote control pad or USB interface. If APL2200 unit is seeded by PL2210 series laser, it is possible to control both laser and amplifier from the same remote control pad.

Alternatively, the amplifier can be controlled from personal computer with supplied software for Windows™ operating system. LabVIEW™ drivers are supplied as well.

SPECIFICATIONS <sup>1)</sup>

Model	APL2201-P90	APL2203-P90	APL2205-P90
<b>Output energy</b>			
at 1064 nm	10 mJ	30 mJ	60 mJ
at 532 nm <sup>2)</sup>	5 mJ	15 mJ	30 mJ
at 355 nm <sup>3)</sup>	3 mJ	10 mJ	20 mJ
at 266 nm <sup>4)</sup>	1 mJ	2.5 mJ	4 mJ
<b>Pulse energy stability (StdDev) <sup>5)</sup></b>			
at 1064 nm	1 %		
at 532 nm	1.5 %		
at 355 nm	2 %		
at 266 nm	4 %		
Pulse duration (FWHM) <sup>6)</sup>	90±10 ps		
Pulse duration stability <sup>7)</sup>	±3 ps		
Pulse repetition rate <sup>8)</sup>	1000 Hz		
Triggering mode	external		
Spatial mode <sup>9)</sup>	Super-Gaussian		
Beam divergence <sup>10)</sup>	<1 mrad	<0.7 mrad	
Typical beam diameter <sup>11)</sup>	~3 mm	~5 mm	~6 mm
Beam pointing stability <sup>12)</sup>	<60 µrad		
Pre-pulse contrast	>50 : 1		
Polarization	linear, >95 %		
<b>PHYSICAL CHARACTERISTICS</b>			
Laser head size (W×L×H)	455 × 1035 × 242 mm	900 × 1500 × 350 mm	1200 × 2200 × 350 mm
Power supply size (W×L×H)	550 × 600 × 680 mm	550 × 600 × 860 mm	550 × 600 × 1030 mm
Chiller size (W×L×H)	400 × 430 × 790 mm	400 × 430 × 790 mm	500 × 500 × 850 mm
<b>OPERATING REQUIREMENTS</b>			
Water service	not required, air-cooled		
Relative Humidity (non condensing)	20–80 %		
Operating ambient temperature	22±2 °C		
Mains voltage	208 or 230 V AC, single phase, 50/60 Hz		
Power rating <sup>13)</sup>	<1.0 kVA	<2.5 kVA	<5 kVA

<sup>1)</sup> Due to continuous improvement, all specifications are subject to change without notice. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise all specifications are measured at 1064 nm. All specifications measured when PL2210B laser as seed laser was used.

<sup>2)</sup> For APL220x-SH and APL220x-SH/FH options. Outputs are not simultaneous.

<sup>3)</sup> For APL220x-TH option. Outputs are not simultaneous.

<sup>4)</sup> For APL220x-SH/FH option. Outputs are not simultaneous.

<sup>5)</sup> Averaged from 300 pulses at 1 kHz pulse repetition rate.

<sup>6)</sup> Depends on seed laser. Optional 30 ps duration, in this case PL2210A laser as seed laser should be used. Inquire for pulse energies.

<sup>7)</sup> Measured over 1 hour period when ambient temperature variation is less than ±2 °C.

<sup>8)</sup> Should be specified when ordering. Inquire for custom pulse repetition rates.

<sup>9)</sup> Gaussian fit >80%.

<sup>10)</sup> Full angle measured at the 1/e<sup>2</sup> level at 1064 nm.

<sup>11)</sup> Beam diameter is measured at 1064 nm at the 1/e<sup>2</sup> level.

<sup>12)</sup> RMS value measured from 300 shots.

<sup>13)</sup> Required current rating can be calculated by dividing power rating by mains voltage.



**OPTIONS**

- **Option P30** provides  $30 \pm 3$  ps output pulse duration. Contact EKSPLA for pulse energy specifications.

**BEAM PROFILE**

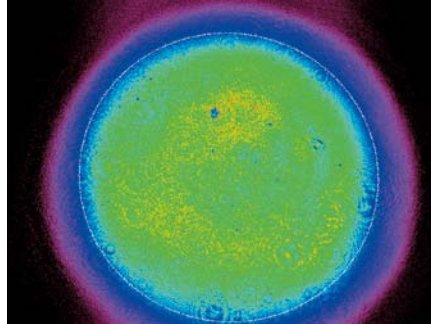


Fig 1. Typical beam profile at APL2200 amplifier output

**OPTICAL LAYOUT**

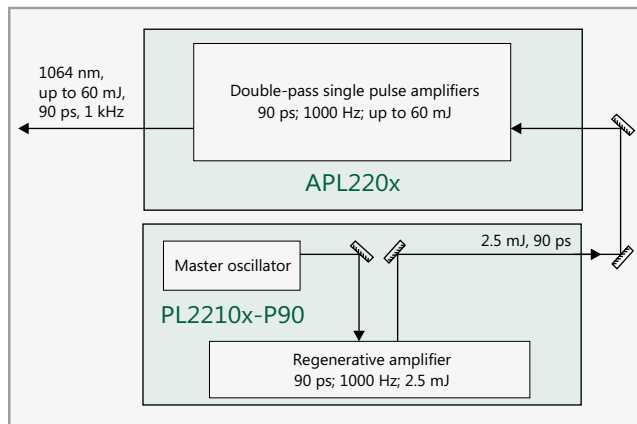
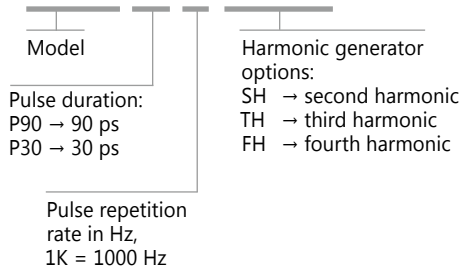


Fig 2. Block optical layout of PL2210 series laser and APL2200 series amplifier

**ORDERING INFORMATION**

**APL2201-P90-1K-SH/TH/FH**



Recommended seed laser for 90 ps is PL2210B. For 30 ps pulse duration use PL2210A as seed laser.